

REMARKS

This Application has been carefully reviewed in light of the Final Office Action mailed February 10, 2005. To clarify various aspects of inventive subject matter, Applicants amend Claims 1, 4-7, 17-20, 24, 44-48, and 51. Applicants also cancel Claims 2-3, 23-31, 50 and 52 without prejudice or disclaimer. To advance prosecution of this application, Applicants have responded to each notation by the Examiner. Applicants submit that all of the pending claims are allowable over the cited references. Applicants respectfully request reconsideration, further examination, and favorable action in this case.

Claim Objections

The Examiner objects to Claims 3, 4, and 51 because of various informalities. Applicants have cancelled Claim 3 and amended Claims 1, 4, and 51 to address the informalities identified by the Examiner. Applicants respectfully request reconsideration and favorable action in this case.

Claim Rejections Pursuant to 35 U.S.C. § 102

The Examiner rejected Claims 24-26, 31, 50, and 52 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 5,887,093 by Hansen ("*Hansen*"). Applicants have cancelled independent Claim 24 and all claims depending therefrom, rendering this rejection moot.

Claim Rejections Pursuant to 35 U.S.C. § 103

The Examiner rejects Claims 1-5, 7-8, 44, 47, and 51 under 35 U.S.C. §103(a) as being unpatentable over *Hansen* in view of "Fiber Optic Communication Systems" paper by Agrawal ("*Agrawal*"). Claims 12-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Hansen* in view of published WO 98/42088 by Grubb ("*Grubb*"). Claims 9-11, 14-16, 21-23, and 27-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Hansen* in view *Agrawal* and further in view of U.S. Patent 6,661,973 by Huber ("*Huber*"). The Examiner rejects Claim 45 under 35 U.S.C. §103(a) as being unpatentable over *Hansen* in view *Agrawal* and as applied to Claim 1 above, and further in view of *Grubb*. The Examiner also rejects Claims 6, 16-20, 46, and 48 under 35 U.S.C. § 103(a) as being unpatentable over *Hansen* in view *Agrawal* and as applied to Claim 1 above, and further in view of U.S. Patent 6,304,368 by Hansen ("*Hansen-2*"). Applicants respectfully traverse these claim rejections for the reasons discussed below.

To defeat a patent under 35 U.S.C. § 103, “the prior art references must teach, disclose, or suggest all the claim limitations.” *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); M.P.E.P. § 706.02(j). Applicants respectfully submit that the cited references, taken alone or in combination, fail to teach or suggest, either expressly or inherently, a number of elements of the pending claims.

a. Independent Claim 1 is patentable over all cited references

Applicants submit that amended Claim 1 is patentable of all the cited references. Among other features, amended independent Claim 1 recites, in part, an input port operable to receive at an optical signal from at least one transmission link, . . . the at least one transmission link comprising a distributed Raman amplifier coupled to the input port.” Amended Claim 1 also recites, in part, “a Raman gain fiber coupled to the input port and operable to amplify the optical signal and to compensate for dispersion associated with the at least one transmission link.” In addition, amended Claim 1 recites “a first pump source coupled to the Raman gain fiber and operable to generate a first pump signal that traverses the Raman gain fiber in a first direction.” Moreover, amended Claim 1 recites “a second pump source coupled to the Raman gain fiber and operable to generate a second pump signal that traverses the Raman gain fiber in a direction counter to the first direction.”

Hansen fails to teach or suggest a number of elements of amended Claim 24. For example, *Hansen* fails to contemplate a first pump signal traverses the Raman gain fiber in a first direction and the second pump signal traverses the Raman gain fiber in a direction counter to the first direction. Thus, *Hansen* fails to teach or suggest an optical element where the “first pump signal traverses the Raman gain fiber in a first direction” and the “second pump signal traverses the Raman gain fiber in a direction counter to the first direction.” Moreover, the *Hansen* disclosure describes a low-loss DCF module capable of compensating for chromatic dispersion in a fiber-optic system and for power loss associated with the DCF. *See e.g., Abstract*. To the extent that *Hansen* discusses Raman gain fibers, this discussion is limited to gain fibers used within the low-loss DCF modules. *See e.g., Figure 1 and 2; see also Col. 4, Lines 54-64; Col. 7, Lines 65 - Col. 8, Line 5*. Thus, *Hansen* fails to teach or suggest a Raman gain fiber coupled to an input port that is coupled to a distributed Raman amplifier. Consequently, *Hansen* fails to teach or suggest amended Claim 1.

The teachings of *Grubb* do not atone for the deficiencies of *Hansen*. For example, nowhere does *Grubb* contemplate that a first pump signal traverses the Raman gain fiber in a first direction and the second pump signal traverses the Raman gain fiber in a direction counter to the first direction. Thus, *Grubb* fails to teach or suggest an optical element where the “first pump signal traverses the Raman gain fiber in a first direction” and the “second pump signal traverses the Raman gain fiber in a direction counter to the first direction.” Moreover, the *Grubb* disclosure describes a multiple stage optical amplifier having a Raman fiber first amplification stage and a rare earth doped second amplification stage with counter-propagating pump signals. *See e.g., Abstract*. To the extent that *Grubb* discusses coupling optical amplifiers, this discussion is limited to the coupling of a Raman amplification stage to a rare earth doped amplification stage. *See e.g., Abstract*. Thus, *Grubb* fails to teach or suggest a Raman gain fiber coupled to an input port that is coupled to a distributed Raman amplifier. Consequently, *Grubb* fails to teach or suggest amended Claim 1.

For at least these reasons, Applicants submit that *Hansen* and *Grubb*, taken alone or in combination, fail to teach or suggest amended Claim 1. Applicants respectfully request withdrawal of the rejection and full allowance of independent Claim 1 and all claims depending therefrom.

b. Independent Claim 12 is patentable over all the cited references

Applicants submit that Claim 12 is patentable over all the cited references. Among other features, independent Claim 12 recites, in part, a Raman gain fiber “comprising a first Raman gain segment and a second Raman gain segment.” In addition, Claim 12 recites “a pump shunt coupled to the signal input port and the signal output port, the pump shunt operable to couple at least a portion of the pump signal between the first Raman gain segment and the second Raman gain segment, wherein the first Raman gain segment is coupled to the signal input port and the second Raman gain segment is coupled to the signal output port and wherein the pump signal traverses the first Raman gain segment in a direction counter to the first direction and then traverses the second segment to deplete the pump power of the pump signal.”

Hansen fails to teach or suggest a number of elements of amended Claim 24. For

example, *Hansen* fails to contemplate a pump shunt that is coupled to a signal input port and a signal output port, where the pump shunt couples at least a portion of the one or more pump wavelengths between a first Raman amplifier fiber and a second Raman amplifier fiber. Moreover, *Hansen* fails to teach or suggest a pump signal that traverses a first Raman gain segment, which is coupled to a signal input port, in a direction that is counter to a direction that an optical signal is traversing the first Raman gain segment and then having the pump signal traverse a second Raman gain segment, which is coupled to a signal output port. To the extent that *Hansen* discusses a pump signal that traverses both a first and second gain medium, this discussion is limited to a pump signal that traverses a first DCF spool, which is coupled to the output of the DCF module (e.g., isolator/coupler 4 of Figure 1), and then having the pump signal traverse the another DCF spool, which is coupled to the signal input of the DCF module (e.g., coupler 2 of Figure 1). *See e.g., Col. 6, Lines 40-50.* Consequently, *Hansen* fails to teach or suggest “a pump shunt coupled to the signal input port and the signal output port, the pump shunt operable to couple at least a portion of the pump signal between the first Raman gain segment and the second Raman gain segment, wherein the first Raman gain segment is coupled to the signal input port and the second Raman gain segment is coupled to the signal output port and wherein the pump signal traverses the first Raman gain segment in a direction counter to the first direction and then traverses the second segment to deplete the pump power of the pump light.”

The teachings of *Grubb* do not atone for the deficiencies of *Hansen*. The *Grubb* disclosure describes a multi-stage optical amplifier having a Raman fiber amplifier first stage and a rare earth doped fiber amplifier second stage. *See e.g., Abstract.* Nowhere does *Grubb* contemplate a pump shunt coupled to the signal input port and the signal output port, the pump shunt is operable to couple at least a portion of the pump signal between the first Raman gain segment and the second Raman gain segment. To the extent that *Grubb* discusses a pump shunt, this discussion is limited to a pump shunt that couples pump wavelengths between a Raman amplifier fiber and a rare earth doped amplifier fiber. *See e.g., Figure 1; see also Page 6, Lines 6-33.* Consequently, *Grubb* fails to teach or suggest a fiber optic transmission system having “a pump shunt coupled to the signal input port and the signal output port, the pump shunt operable to couple at least a portion of the pump signal between the first Raman gain segment and the second Raman gain segment, wherein the first Raman gain segment is coupled to the signal input port and the second Raman gain segment

is coupled to the signal output port and wherein the pump signal traverses the first Raman gain segment in a direction counter to the first direction and then traverses the second segment to deplete the pump power of the pump light.”

Finally, the Examiner has not cited language in either reference or within information commonly known to those skilled in the art that provides the necessary motivation or suggestion to combine these two references. The M.P.E.P. sets forth a strict legal standard for finding obviousness based on a combination of references. According to the M.P.E.P., “Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge [that was] generally available to one of ordinary skill in the art” at the time of the invention. M.P.E.P. 2143.01. The “fact that references can be combined or modified does not render the resultant combination [or modification] obvious unless the prior art also suggests the desirability of the combination” or modification. *Id.* (emphasis in original).

The governing Federal Circuit case law makes this strict legal standard even more clear.¹ According to the Federal Circuit, “a showing of a suggestion, teaching, or motivation to combine . . . prior art references is an essential component of an obviousness holding.” *In re Sang-Su Lee*, 277 F.3d 1338, 1343 (Fed. Cir. 2002) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25 (Fed. Cir. 2000)). “Evidence of a suggestion, teaching, or motivation . . . may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, the nature of the problem to be solved.” *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999). However, the “range of sources available . . . does not diminish the requirement for actual evidence.” *Id.* In *In re Dembiczak*, the Federal Circuit reversed a finding of obviousness by the Board of Patent Appeals and Interferences, explaining that proper evidence of a teaching, suggestion, or motivation to combine is essential to avoid impermissible hindsight reconstruction of an applicant's invention:

Our case law makes clear that the best defense against the subtle but powerful attraction of hind-sight obviousness analysis is *rigorous application of the requirement for a showing of the teaching or motivation to combine prior art*

¹ Note M.P.E.P. 2145 X.C. (“The Federal Circuit has produced a number of decisions overturning obviousness rejections due to a lack of suggestion in the prior art of the desirability of combining references.”).

references. Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability—the essence of hindsight.

175 F.3d at 999 (quoting *W.L. Gore & Assoc., Inv. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983)) (emphasis added) (citations omitted).²

In the present case, the Examiner is improperly using the Applicants' disclosure as a blueprint for piecing together various elements of *Hansen* and *Grubb*. As provided above, the mere fact that references can be combined does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990). Thus, the mere fact that the teachings of one reference would improve the teachings of another reference as asserted by the Examiner does not provide the required suggestion to combine. The showing must be clear and particular. *See, e.g., C.R. Bard v. M3 Sys., Inc.*, 48 U.S.P.Q.2d 1225, 1232 (Fed. Cir. 1998). Without such independent suggestion, the art is to be considered as merely inviting unguided and speculative experimentation which is not the standard with which obviousness is determined. *Agmen Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200 (Fed. Cir. 1991).

To reject Claim 12 under the proposed *Hansen-Grubb* combination, the Examiner has made conclusory “it would have been obvious” statements. For example, the Examiner has merely stated that “it would have been obvious” to make the proposed combination “to apply the pump shunt of *Grubb* to the invention of *Hansen* for the advantage of pump power reuse.” *Office Action at 9*. The Examiner has presented no evidence, however, that suggests or motivates the combination. It is improper for the Examiner to use hindsight having read the Applicant's disclosure to arrive at an obviousness rejection. *In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988).

Consequently, a *prima facie* case of obviousness cannot be maintained with respect to Claim 12, as the Examiner has not show the requisite proof necessary to establish a suggestion or motivation to combine the cited references.

² *See also In Re Jones*, 958 F.2d 347, 351 (Fed. Cir. 1992) (“Conspicuously missing from this record is any evidence, other than the PTO's speculation (if that can be called evidence) that one of ordinary skill in the herbicidal art would have been motivated to make the modification of the prior art salts necessary to arrive at” the claimed invention.).

For at least these reasons, Applicants submit that *Hansen* and *Grubb*, taken alone or in combination, fail to teach or suggest Claim 12. Applicants respectfully request withdrawal of the rejection and full allowance of independent Claim 12 and all claims depending therefrom.

No Waiver

All of Applicants' arguments and amendments are without prejudice or disclaimer. Additionally, Applicants have merely discussed example distinctions from the *Hansen* and *Grubb* references. Other distinctions may exist, and Applicants reserve the right to discuss these additional distinctions in a later Response or on Appeal, if appropriate. By not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner's additional statements. The example distinctions discussed by Applicants are sufficient to overcome the anticipation and obviousness rejections.

CONCLUSION

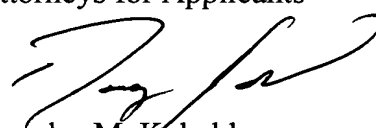
Applicants have made an earnest attempt to place this case in condition for allowance. Because this Amendment places all claims in condition for allowance or at least in a better condition for appeal, Applicants respectfully request that this Amendment be entered.

Applicants do not believe that any fees are due. However, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 02-0384 of Baker Botts L.L.P.

If the Examiner feels that a conference would advance prosecution of this Application in any manner, Douglas M. Kubehl stands willing to conduct such a telephone interview at the convenience of the Examiner. Mr. Kubehl may be reached at 214-953-6486.

Respectfully submitted,

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Date: April 8, 2005

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